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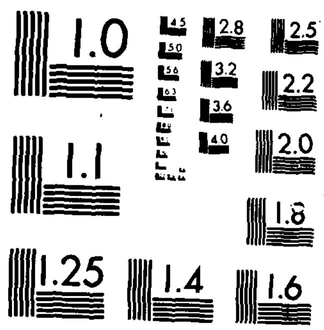

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NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

AN EVALUATION OF THE PRODUCTIVITY ENHANCING
CAPITAL INVESTMENT PROCESS AT THE SHORE
INTERMEDIATE MAINTENANCE ACTIVITY
LITTLE CREEK, VIRGINIA

by

William J. Marshall III

December 1985

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Thesis Co-Advisor: D. E. Melchar

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This thesis evaluates the productivity enhancing capital investment (PECI) process at the Shore Intermediate Maintenance Facility (SIMA) Little Creek, ~~Virginia~~ VA. Based upon an on-site study, the existing PECI projects, the PECI application process, and productivity enhancing ideas are described. The structure of SIMA's organization has resulted in a filtering mechanism that restricts the flow of productivity enhancing ideas. Recommendation to improve the productivity enhancing process at SIMA Little Creek are enumerated.

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An Evaluation of the Productivity Enhancing Capital Investment Process at the Shore Intermediate Maintenance Activity Little Creek, Virginia

by

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Lieutenant Commander, United States Navy
B.A., Villanova University, 1972

Submitted in partial fulfillment of the requirements for the degree

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

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ABSTRACT

This thesis evaluates the productivity enhancing capital investment (PECI) process at the Shore Intermediate Maintenance Facility (SIMA) Little Creek, Virginia. Based upon an on-site study, the existing PECI projects, the PECI application process, and productivity enhancing ideas are described. The structure of SIMA's organization has resulted in a filtering mechanism that restricts the flow of productivity enhancing ideas. Recommendations to improve the productivity enhancing process at SIMA Little Creek are enumerated.

TABLE OF CONTENTS

I. INTRODUCTION

A. THESIS OBJECTIVE

This research project is a portion of a study commissioned by the Office of the Deputy Assistant Secretary of Defense for Civilian Personnel Policy to gain an understanding of the productivity enhancing process that exists at the activity level. Department of Defense (DoD) recognizes the need to get the most productivity from defense budget dollars and continues to focus attention on productivity enhancing programs.

In an effort to obtain the most productivity from budgeted dollars an understanding of the productivity enhancing process is required. The productivity enhancing process can be described and understood by examining what occurs at the activity level. This paper examines the productivity enhancing process at the Shore Intermediate Maintenance Activity (SIMA), Naval Amphibious Base (NAB), Little Creek, Virginia.

B. SCOPE

Productivity Enhancing Capital Investment (PECI) projects and the productivity enhancing process at the activity level are described. The evolution from the

productivity enhancing process to submission of PECI projects for budget consideration is illustrated.

Shop supervisors are frequently the primary source of productivity enhancing ideas. By determining what the shop floor ideas were and comparing them with the installed PECI projects and the projects which have been requested, impediments that block the productivity enhancing communication process are identified. An understanding of the productivity enhancing process and the required PECI dollars needed to fund productivity enhancements at the activity can be used by the program manager to obtain greater productivity per DoD budget dollar.

C. RESEARCH METHODS

The research methodology for this research project included the following: (1) analysis of primary source documents (DoD directives/instructions and service instructions), (2) data collection at SIMA Little Creek via personal and telephone interviews, (3) physical observation at SIMA Little Creek and (4) personal interview with PECI program coordinator for Commander Naval Surface Forces Atlantic Fleet (CNSL), Norfolk, Virginia.

These techniques were employed in answering three research questions:

1. What is the productivity enhancing process that exists at SIMA Little Creek?

2. What productivity enhancing ideas exist at SIMA Little Creek?

3. What impediments block the development or communication of productivity enhancing ideas?

D. SYNOPSIS OF THESIS CONTENTS

Chapter II introduces the Productivity Enhancing Capital Investment program at the Department of Defense and Department of Navy level. Chapter III describes productivity and how productivity is measured within the Department of Defense. Chapter IV presents SIMA Little Creek, it's mission, organization and management control process. Chapter V explains how productivity is measured at SIMA Little Creek. Chapter VI illustrates the productivity enhancing process, PECI projects and shop level productivity enhancing ideas that exist at SIMA Little Creek. Chapter VII discusses impediments that block the development or communication of productivity enhancing ideas. Chapter VIII assesses the PECI program at SIMA Little Creek and presents opinions, recommendations, and recommended areas for further study.

II. THE DEPARTMENT OF DEFENSE (DOD) PRODUCTIVITY ENHANCING CAPITAL INVESTMENT (PECI) PROGRAM

A. BACKGROUND

The Productivity Enhancing Capital Investment (PECI) program is an element of the DOD Productivity Program established by DOD Directive 5010.31, DoD Productivity Program, of April 27, 1979. PECI programs are sponsored by the Office of the Secretary of Defense (OSD) as a tri-service effort to fulfill the following objectives:

1. Improve the efficiency and effectiveness of defense organizations and activities by encouraging the application of capital equipment and facilities to improve methods of operation.
2. Increase the level of consciousness among defense managers of the potential for productivity improvement through capital investments.
3. Promote the substitution of capital for labor as a means of optimizing the output of the defense work force. [Ref. 1:p. 2]

This chapter reviews the PECI program and looks at the initiatives taken by the Navy in implementing the program.

B. WHAT IS PECI?

The PECI program ". . . provides for capital investment in equipment and facilities which will increase output of an organization in relationship to inputs." [Ref. 2:p. 64]

The PECI program sets aside funds in the annual budget and makes them available to managers and personnel for a

wide range of cost and labor-saving investments. Productivity offices in each of the services and the defense agencies, with counterparts at major command levels, carry out the productivity enhancing capital investment program. The Defense Productivity Program Office (DPPO) provides program overview and technical support. Each service has its own operating procedures to process investment proposals and funding, as set forth in Army Regulation 5-4, Air Force Regulation 25-3 and Secretary of the Navy Instruction 5200.31A. [Ref. 3]

C. TYPES OF FUNDS

The PECI programs are differentiated for the purpose of classification as: (1) Industrial Fund Fast Payback (IFFP) program (2) Other-Component Sponsored Investment (CSI) program or (3) OSD-sponsored programs.

The IFFP projects are provided for in DoD Directive 7410.4 and DoD Instruction 7410.5. The IFFP provides PECI financing for projects funded through DoD industrial funds. The CSI program has a longer payback period and different cost or benefit criteria than those specified for PEIF or PIF projects. The CSI funding provides money to fund PECI projects of particular concern to the individual services. [Ref. 4:pp. 3-4]

The OSD-sponsored projects include two programs that can increase productivity at the activity level, the

Productivity Enhancing Incentive Fund and the Productivity Investment Fund.

Productivity Enhancing Incentive Fund (PEIF) projects are fast payback PECI projects financed from drawing accounts established within annual appropriations. The significance of this fund is that funds can be obtained within the calendar year they are requested. These projects cannot exceed $100,000 and must be expected to amortize within two years of the date they become operational.

Productivity Investment Fund (PIF) projects are PECI projects that have been competitively selected by OSD from candidate proposals submitted by DoD components and financed through traditional budget appropriation processes from funds set aside by OSD for this purpose. The PIF projects cost $100,000 or more and must have a payback period of four years or less. There is no upper dollar limit to PIF projects. Unlike PEIF funds which can be obtained in short periods, PIF funds are long lead time budget proposal items.

D. PECI PROGRAMS

The PEIF and PIF funded programs are the two subprograms within the DoD PECI structure that have the most potential to enhance productivity capital investment at the Navy activity level. These complimentary subprograms are fundamentally different in scope and are designed to supplement each other. [Ref. 5:p. 64]

PEIF projects are supported via special accelerated funding. To encourage productivity enhancement, the Office of the Secretary of Defense directed the services to establish Productivity Enhancing Capital Investment accounts. Using this concept, the Productivity Enhancing Investment Fund line item was established in the Other Procurement, Navy (OPN) appropriation. This pool of money is used by Navy non-industrial funded activities. Although the line item amount is approved by Congress, individual project approval is the domain of the service. [Ref. 6:p. 1]

These specially established funds provide timely financing for fast payback PECI opportunities. As a result, PEIF funds have become known as a "quick reaction" resource because claimants within a service can apply for money and if the project is approved receive funding within a year. [Ref. 7:p. 65]

The PIF program resulted during Program Objective Memorandum review (POM):

> Preparation of the FY 81-85 POM reviewed by OSD showed that productivity investment accounted for very little of proposed service expenditure. This finding was the motivation for creating Productivity Investment Funds (PIF). Accordingly, PIFs became "set aside" funds. . . . The first PIFs were funded in FY 81. So far the average cost of them has been $2 million, with an average payback of 2.5 years. . . . Approximately $700 million has been requested under PIF by all the services for FY 83-87. [Ref. 8:p. 66]

Funding criteria for PIF projects are weighted combinations of the payback period, investment costs per man-hour, internal rate of return, return on investment, net present value, total savings and manpower savings. Current project evaluation is based on three equally weighted aspects: (1) total savings divided by total investment, (2) internal rate of return and (3) an arbitrary figure relating investment costs to manpower savings. [Ref. 9:p. 66]

The different services and agencies submit their program requests to DPPO which in turn prioritizes the requests on the basis of total return. Overshadowing this process is the scarce amount of budgeted "productivity dollars" which has limited approved project dollars to one out of every six requested [Ref. 10:p. 66].

E. DEPARTMENT OF NAVY PRODUCTIVITY PROGRAM

Secretary of the Navy instruction, SECNAVINST 5200.31A of 1 June 1981 implements the Department of Navy Productivity Improvement Program as required by DoD Directive 5010.31 of 27 April 1979. The objectives of SECNAVINST 5200.31A are:

- Elevate visibility of productivity as an essential dimension of management with DON.
- Develop productivity enhancement initiatives as a means to achieve the highest level of readiness within available resources.
- To stimulate managers, at all levels of organization, to focus on the underlying mission of their organizations,

to develop valid measures of output, and explore methodologies to improve organization performance.
- To create a climate which will lead to the implementation of a well organized and economically sound productivity enhancing capital investment program.
- To enhance the Quality of Working Life of the Navy's military and civilian workforce through the establishment of meaningful incentives and the elimination of disincentives to productivity.
- Foster the utilization of productivity data in program, budget and performance evaluation. [Ref. 11:pp. 1-2]

Detailed guidance and the assignment of responsibilities are spelled out in this instruction and provide the basic framework for the Navy's PECI programs.

F. NAVY PECI PROGRAMS

Comptroller of the Navy instruction NAVCOMPINST 7000.38A of 30 December 1982 states Department of the Navy (DON) policy concerning the Productivity Enhancing Incentive Fund and establishes the procedures to be used to identify projects, funding and reporting requirements.

Department of the Navy PEIF program objectives are to:

- Provide activities, submitting candidate projects, with funding during the current fiscal year. PEIF funding is provided to Navy in the normal budget cycle without specific project identification. Approved projects are funded immediately rather than waiting the two years of the budget cycle.
- Advance the efficiency and effectiveness of activities by encouraging the application of capital equipment to improve methods of operation.
- Increase the consciousness of Navy managers of the potential for productivity improvement through capital investments.
- Promote the substitution of capital equipment for labor to optimize the output of the work force. [Ref. 12:p. 1]

Candidate projects can be submitted at any time during the fiscal year, though Navy major claimants normally issue

"calls" early in the calendar year requesting PEIF project proposal submissions. These projects are submitted via the chain of command to the Chief of Naval Operations (CNO) who validates the requirement and the technical soundness of the program, verifies the payback computations and fund allocation. Approved projects are allocated by CNO. [Ref. 13:pp. 3-4]

No Navy instruction currently addresses the PIF fund separately as NAVCOMPINST 7000.38A does for PEIF projects. Current guidance is derived from DoDINST 5010.36 and local directives. (In the case of Shore Intermediate Maintenance activity [SIMA] Little Creek, local guidance is provided by COMNAVSURFLANTINST 4400.1C.)

The PECI program is designed for the non-industrial funded Navy activity as an alternative funding method to increase productivity. This is a singularly important source of funding for the non-industrial activity to acquire financing specifically designed for productivity enhancing projects. The PECI project application and submission process is illustrated in Chapter VI.

III. PRODUCTIVITY

The PECI program is based upon the premise that by improving productivity, DoD can get the most out of the defense budget dollars. This chapter discusses productivity, and how DoD defines productivity.

A. INTRODUCTION

Productivity can be generally defined as the transformation of resources (inputs) into desired results (outputs). The inputs can be raw materials or partially finished goods which are acted upon to create desired outputs, such as finished goods or services. Productivity measurement is the determination and comparison of the change of output-input relationships for two or more periods of time. [Ref. 14:p. 7]

Productivity is the ratio of outputs to inputs:

$$\text{Productivity} = \frac{\text{output}}{\text{input}}.$$

It is the ratio of goods produced or services rendered to resources expended. Productivity is not the measure of output produced, but a measure of how well inputs are used to accomplish desired results:

$$\text{Productivity} = \frac{\text{output}}{\text{input}} = \frac{\text{results achieved}}{\text{resources consumed}}.$$

Productivity ratios commonly measure many different output/input changes--output per labor hour, output per unit of capital and so on. Each of these separate productivity ratios is influenced by a combination of many factors. These factors include the quantity and quality of available resources, the size and capacity of the organization, the skill level and motivation of the work force, and management motivation and effectiveness. How these factors interrelate determines the resulting productivity as measured by the productivity ratio. [Ref. 15:p. 3]

Frequently used measures of productivity define productivity as output per unit of labor input [Ref. 16:p. 4]. This type of measure is usually associated with profit oriented organizations. If finan ial performance is measured in terms of profit, i.e., the difference between the revenues and expenses, the organization is termed "profit-oriented." This measure is fundamental to profit-oriented organizations. It has the following advantages:

1. It provides a single criterion that can be used in evaluating proposed courses of action.
2. It permits a quantitative analysis of these proposals in which benefits can be directly compared with costs.
3. It provides a single, broad measure of performance.
4. It facilitates decentralization.
5. It permits comparisons of performance to be made among responsibility centers that are performing dissimilar functions. [Ref. 17:p. 747]

The profit measure is not appropriate for all types of organizations. Not-for-profit, or "nonprofit" organizations exist primarily to render a service and their success can be measured by how much they contribute to the public welfare. Government organizations are included in this category along with educational organizations, hospitals, religious and charitable organizations [Ref. 18:p. 745]. The absence of a satisfactory, single, overall measure of performance that is comparable to the profit measure is the most serious management control problem in nonprofit organizations [Ref. 19:p. 747].

Given a constant production output, if an organization stresses quality control, it can improve productivity by using less resources, recycling materials, and using more efficient production techniques. The use of fewer resources, improved quality control and the attendant reduced waste leads to cost reduction.

> In its broadest sense, productivity includes all resources and their costs and as such presents the greatest opportunity to improve profit in any for-profit business and to provide more service for every dollar spent in nonprofit organizations. [Ref. 20:p. 5]

B. PRODUCTIVITY MEASUREMENT

In nonprofit organizations an important step toward increasing productivity and thereby increasing services rendered is to design and implement meaningful productivity measurements.

$$\text{Productivity} = \frac{\text{effectiveness}}{\text{efficiency}} .$$

Productivity is the ratio of the effectiveness with which the organizational goals are achieved to the efficiency with which the resources are used [Ref. 21:p. 53].

Measuring productivity is especially difficult in nonprofit organizations. Measurement is made even more difficult when different types of services are rendered within a single organization. Broad based measurement devices further exacerbate the measurement problem. Broad based measurements combine numerous smaller ratios and are often of no use in describing what actual productivity is occurring. A program to measure productivity must provide its own resources and have the support of staff and line personnel to maintain the measurement function. [Ref. 22:pp. 57-58]

C. CRITERIA FOR MEANINGFUL MEASUREMENT

The following are important criteria in successfully establishing productivity measurements:

1. Validity: Accurately reflects changes in productivity.
2. Completeness: Takes into consideration all components of both the output and the input for a given productivity ratio.
3. Comparability: Enables the accurate measuring of productivity change between periods.
4. Inclusiveness: Takes into account and measures separately the productivity of all activities.
5. Timeliness: Ensures that data is provided soon enough for managerial action to be taken when problems arise.

6. Cost-effective: Obtains measurements in a manner that will cause the least interruption possible to the ongoing productive efforts of the organization.

> The more closely productivity measurements meet the above criteria, the more useful they are for improving productivity. [Ref. 23:p. 62]

To improve productivity in nonprofit organizations, accurate measurement of productivity at the local activity level is necessary. Improving "sales" is not a viable alternative for nonprofit organizations. Comparisons of past and present productivity levels of each work activity within the organization provides productivity measurement yardsticks, or indicators. Using these indicators, management can establish goals and objectives in an effort to increase productivity.

> The goal of a nonprofit organization is not to widen the difference between outputs and inputs. Rather, its goal is to render as much service as possible with a given amount of resources, or to use as few resources as possible to render a given amount of service. [Ref. 24:p. 753]

The capability to improve productivity is dependent upon accurate, valid and complete productivity measurements applied throughout the organizations work activities [Ref. 25:p. 75].

D. DoD PRODUCTIVITY AND MEASUREMENT

The federal government has been interested in productivity and productivity measurement since the early 1960's. In the 1970's, the federal government attempted to measure the productivity of two thirds of its employees.

The Federal Productivity Measurement System defines productivity as the ratio between the units produced or services rendered by an organization to the resources used in production during a specified time. A division of the Bureau of Labor Statistics provides the technical guidance necessary to identify the output measures thought to be most meaningful. Federal productivity measurements emphasize the amount of end products produced for a given amount of inputs --that is, efficiency. Effectiveness, the idea of quality and level of service provided receives less attention. Naturally comparisons between federal and private productivity measures have evolved, which has resulted in the public perception that governmental productivity is lower than the private sector. Critics have noted that direct comparisons of federal versus private-sector productivity measurements are not meaningful, however the perception still exists. [Ref. 26:pp. 33-40]

Since 1972, DoD has been actively interested in measuring productivity. The most common productivity index is labor-hours, resulting in a measure of output per employee-hour. In support of the DoD productivity measurement program the Department of Defense Instruction 5010.31 of April 27, 1979, DoD PRODUCTIVITY PROGRAM, sets forth the DoD Productivity program. The goals of the DoD Productivity Program are: (1) to focus management attention on achieving maximum defense outputs; (2) to provide

productivity measurement, enhancement, and evaluation as an integral element of management; (3) to be labor oriented--the primary basis for productivity assessment will be labor oriented; (4) to focus productivity enhancement on labor cost savings as well as reducing unit cost of operations; and (5) to base labor resource decisions in the programming and budgeting processes on productivity statistics where available.

DoDINST 5010.31 defines productivity as "the ratio of goods or services rendered (output) to resources expended (input)." Productivity improvement is defined as "increasing the ratio of goods produced or services rendered (outputs) to resources expended (inputs). (Synonym: Productivity Enhancement)."

Department of Defense Instruction 5010.34 of August 4, 1975, PRODUCTIVITY ENHANCEMENT, MEASUREMENT, AND EVALUATION OPERATING GUIDELINES AND REPORTING INSTRUCTIONS, is a detailed guide to DoD productivity measurement, and discusses the productivity index of an organization as:

> . . . the efficiency with which its resources are utilized to produce final outputs. The relationship between the volume of goods produced or services rendered can be expressed in terms of a productivity index.
>
> Development of productivity indices permits a comparison of an output-input relationship (productivity) of a current period with a previous period of time. A labor-productivity index is the type of productivity index most frequently developed, largely because labor is almost universally required in accomplishing all types of work.

> Labor-productivity measurement compares labor performance during two periods of time, usually a current period and a previous period, known as a base period. It compares actual manpower expended and the resulting products produced, or services rendered, during the two periods of time and discloses the labor performance of an activity or group of individuals during the current period in relation to their performance during a previous period of time.
>
> A labor-productivity index normally represents an overall measure which reveals, but does not separately identify, the results of all actions affecting labor productivity, such as;
> 1. Investments in labor-saving equipment;
> 2. Changes in organizations, systems, work processes, and employee skills;
> 3. Individual motivation and effort; and
> 4. Changes in quality of the goods purchased or services ordered. [Ref. 27:encl 3;p. 2]

Evaluation of productivity measurement reveals trends and allows managers to take action steps to curb or change undesirable trends. These trends can be used by managers to study and assess the benefits or lack of benefits resulting from past actions such as productivity enhancing capital investment projects, changes in organizational structure, or changes in motivational techniques.

IV. SHORE INTERMEDIATE MAINTENANCE ACTIVITY (SIMA) NAVAL AMPHIBIOUS BASE (NAB), LITTLE CREEK, VIRGINIA

The SIMA Little Creek, is located on the western side of the Naval Amphibious Base, Little Creek, Virginia. This location on NAB puts SIMA adjacent to the waterfront (Little Creek basin, just south of the Chesapeake Bay) providing easy access for the ships. Located within the Hampton Roads metropolitan area, southeastern Tidewater boasts the site of the world's largest naval shipbuilding, ship repair, and ship modernization centers in the world [Ref. 28].

A. MISSION OF SIMA LITTLE CREEK

The Commander Naval Surface Forces U.S. Atlantic Fleet (CNSL) instruction 9000.1A, COMNAVSURFLANT MAINTENANCE MANUAL, of July 1983, states the mission of SIMA Little Creek:

> . . . to perform intermediate level maintenance which normally consists of calibration, repair or replacement of damaged or unserviceable parts, components, or assemblies; the emergency manufacture of unavailable parts; and technical help to customer organizations. Fleet modernization work (ship alteration [SHIPALT]/ ordinance alteration[ORDALT] installation) will be limited to those alterations which have been previously planned (drawings and material available, etc) to permit the command to concentrate on essential repair work. Additionally, Shore Intermediate Maintenance Activity, Little Creek will maintain, under the direction of COMNAVSURFLANT (CNSL), a boat pool to issue, as required boats to COMNAVSURFLANT commands. [Ref. 29]

Talking with SIMA Little Creek personnel reveals a much

simplified command mission--". . . to repair ships in time to meet operational commitments" [Ref. 30].

B. SIMA LITTLE CREEK

1. Activities and Services

The SIMA Little Creek is under the operational control of Naval Surface Force U.S. Atlantic Fleet Readiness Support Group (Figure 4.1). One of four repair activities under their control, these repair activities are funded for operational expenses by the budget appropriation categories of Operations and Maintenance, Navy (O&M,N) and the Operations and Maintenance, Navy Reserve (O&M,NR). For investment procurement, the repair activities are funded via the Other Procurement, Navy (OP,N) appropriation category. The annual budget for SIMA Little Creek is presently in the nine million dollar range. Of significant note is that SIMA activities do not use Navy Industrial Fund (NIF) appropriation funds as do the much larger repair and maintenance activities, i.e., Navy shipyards, ordnance facilities and public works centers. [Ref. 31]

The SIMA Little Creek is housed in a new facility that was originally designed as a boat repair activity with sufficient working space for 368 employees. Current employment is approximately 460 personnel, mostly enlisted Navy men and women. Due to the overflow of personnel and shops, the old facility (situated directly across the street

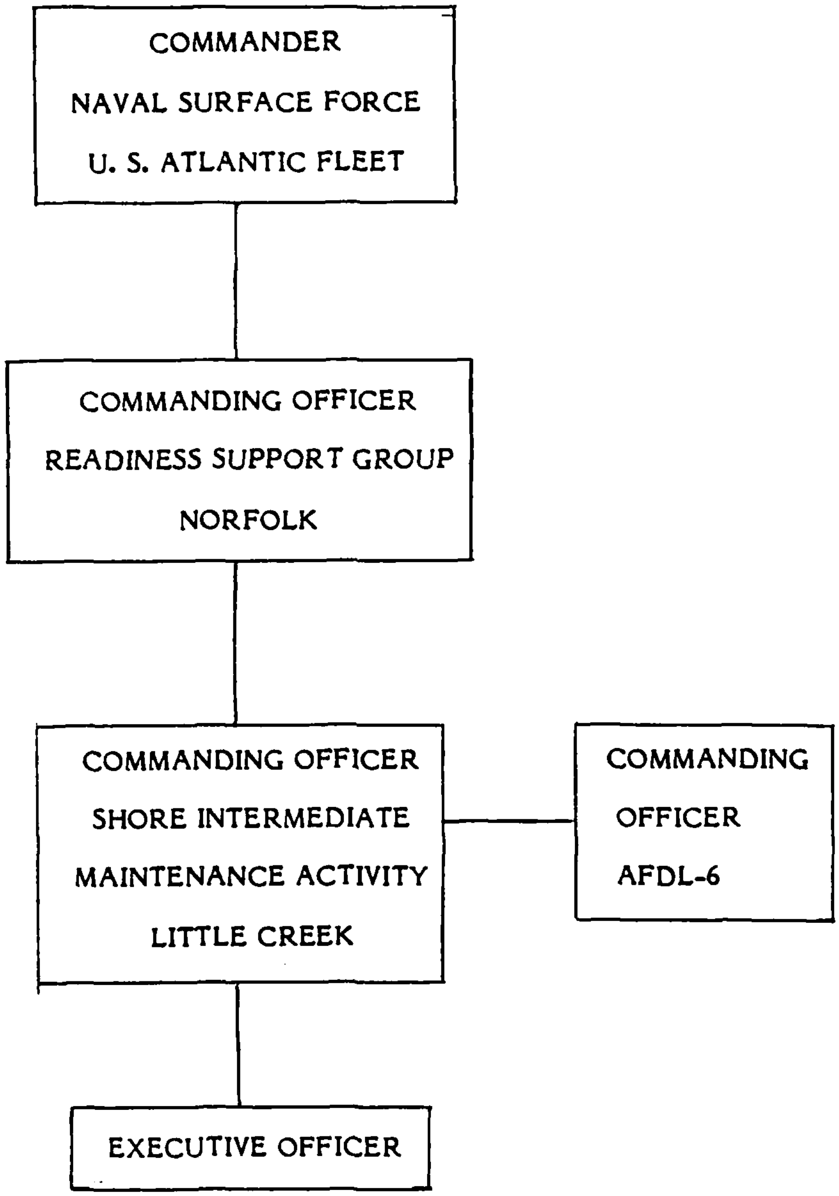

Figure 4.1: SIMA Little Creek Reporting Senior

Source: Adapted from SIMALCREEKINST 5400.1A

from the new one) is still being used for several functions. Although SIMA's facility is designed as a small boat shop, it continues to carry out its much larger assigned mission. Serving as a repair facility for assigned ships and small craft, SIMA Little Creek services a majority of ships located in the homeport of Little Creek. These ships consist mainly of active Navy amphibious ships, minesweepers, small boats, and several reserve ships. However, SIMA Little Creek is available and frequently assigned to service ships homeported at Norfolk Naval Station and elsewhere. Additional services consist of a large small boat pool, landing craft boat pool and sandblasting services. A floating dry dock, AFDL-6 (Figure 4.1) stationed at Little Creek, is also under the operational control of the Commanding Officer, SIMA Little Creek. [Ref. 32]

2. Organization

The management structure of SIMA Little Creek is established along the functional lines of a production activity and support organization (Figure 4.2). The senior level of organization is the command level, while the next level, management, consists of department heads. Departments may be subdivided into divisions, branches, sections, and shops. Department heads report directly to the Commanding Officer. Department heads are expected to provide close coordination and control over the functions

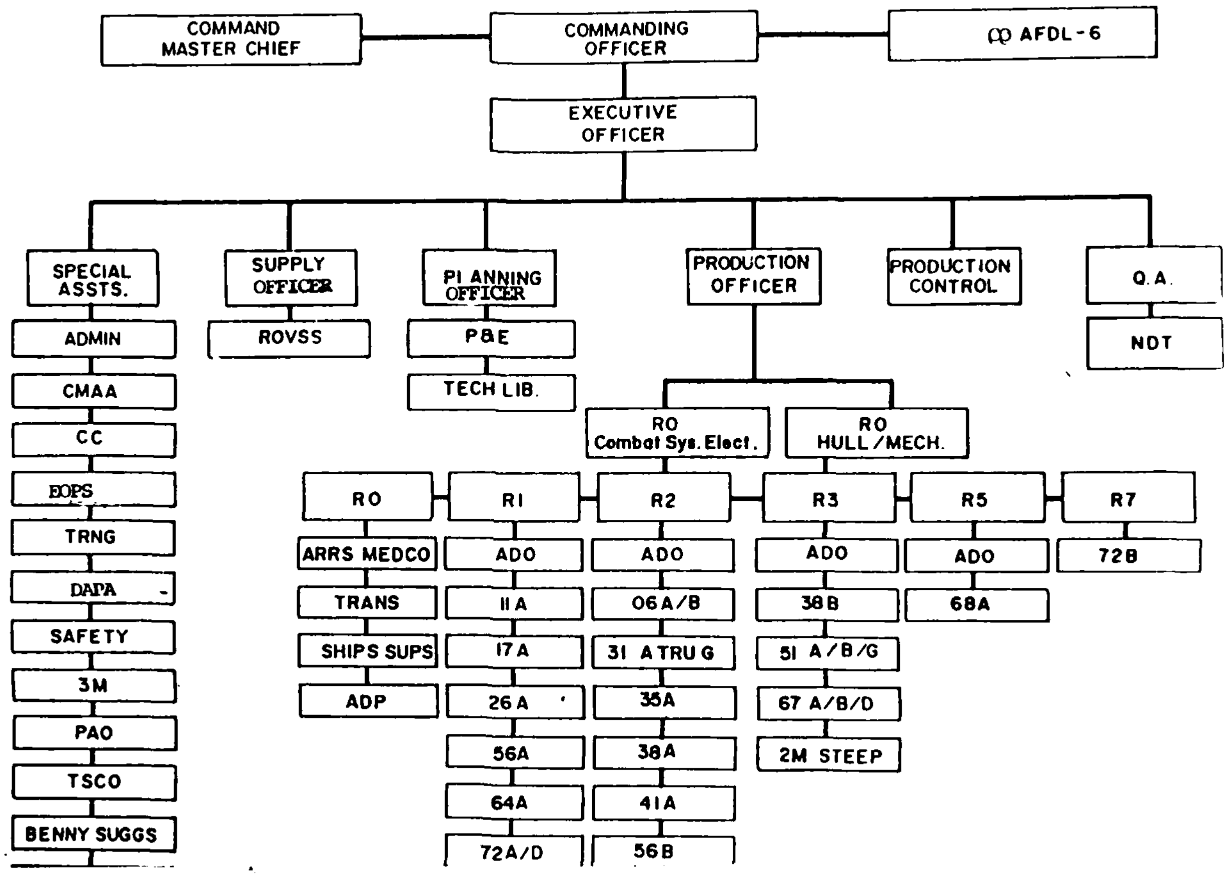

Figure 4.2: SIMA Little Creek Command Organization

Source: Adapted from SIMALCREEKINST 5400.1A

under their control in providing support to the Commanding Officer in carrying out the command's mission. This type of organizational structure provides a decentralizing effect, allowing more decision making authority to be placed at lower levels and relieving the command level of daily administrative routine. A pleasant side effect of this type of structure is that the management team and supervisors are able to develop into a closer knit group and are better able to establish good working relationships with their personnel.

a. Command Level

(1) Commanding Officer. The Commanding Officer is responsible to the Commander, Readiness Support Group, Norfolk for mission accomplishment. He is responsible for directing the operations of SIMA Little Creek in an efficient, effective, and economical manner.

(2) Executive Officer. The Executive Officer assists the Commanding Officer in the management of SIMA Little Creek. He concentrates mainly on military matters and the administrative side of management.

b. Management, the Department Head Level

(1) Supply Officer. The Supply Officer is responsible for the procurement of all material and equipment needed to fulfill the mission of SIMA Little Creek. He is responsible for the overall professional, military and administrative performance of the supply

department. Key responsibilities are to:

- manage financial and material resources.
- prepare operating and equipment budgets.
- keep command and other levels of management appraised of fund status.
- operate and maintain warehouses and other storage facilities.
- prepare financial reports.
- maintain inventory control of repair parts, industrial materials, controlled equipage, and plant property.
- purchase supplies.
- receive and distribute materials and equipments.
- operate material pools.
- identify instances of fraud, waste or abuse.
- identify sources of supply, and expedite material procurement to ensure material deliveries meet productive schedules.

The Supply Officer reports directly to the Commanding Officer in matters concerning repair and material support. He reports directly to the Executive Officer in all administrative and military matters concerning the department.

(2) Planning Officer. The Planning Officer is responsible for the planning and estimation of all repair jobs undertaken by SIMA Little Creek. He reports directly to the Commanding Officer in mission matters and to the Executive Officer for military and administrative matters.

(3) Production Officer. The Production Officer directs the two largest production/repair areas at SIMA Little Creek, with the assistance of two Repair Officers in charge of the Combat Systems Electrical repair division (R1 and R2 divisions) and Hull and Mechanical repair divisions (R3, R5, and R7). The Production Officer is in charge of the single most important area in accomplishing the organization's assigned mission. He is responsible for the accomplishment of repairs and alterations of those ships, boats, and auxiliary craft made available for such work by higher authority. The Production Officer reports directly to the Commanding Officer in all matters concerning repair work, and to the Executive Officer for military and administrative matters.

(4) Production Control Officer. The Production Control Officer is responsible for scheduling the accomplishment of work to ensure its timely and satisfactory completion in accordance with prescribed methods and standards.

(5) Quality Assurance Officer. The Quality Assurance Officer directs the efforts of the Quality Assurance (Q.A.) and special testing department. This department develops quality and reliability specifications for all work performed at SIMA Little Creek.

(6) Special Assistants. The command is supported by a number of special assistants functioning in a

staff capacity, including the Administrative Officer, Chief Master at Arms, Career Counselor, Safety Officer, and others. [Ref. 33]

C. MANAGEMENT CONTROL PROCESS

The clearly defined organizational structure of SIMA Little Creek establishes rigid management controls via the military chain of command concept. Each organizational level is responsible to a more senior individual in the chain of command. This concept is carried even further within the same levels of the organization and within the shop level. Each member of the organization reports to an individual who is senior to him. This ancient and time-honored military management system is augmented by additional management controls, e.g., management by walking around, budgetary constraints, and others. It has proven to an effective management method.

Anthony, Dearden and Bedford, in Management Controls Systems, describe a formal management control system as consisting of the four interrelated phases of programming, budgeting, operating and measurement, and reporting and analysis as depicted in Figure 4.3. SIMA Little Creek does not have such a formally structured management control system. Instead they rely on an informal process consisting of informal communication and interactions between the

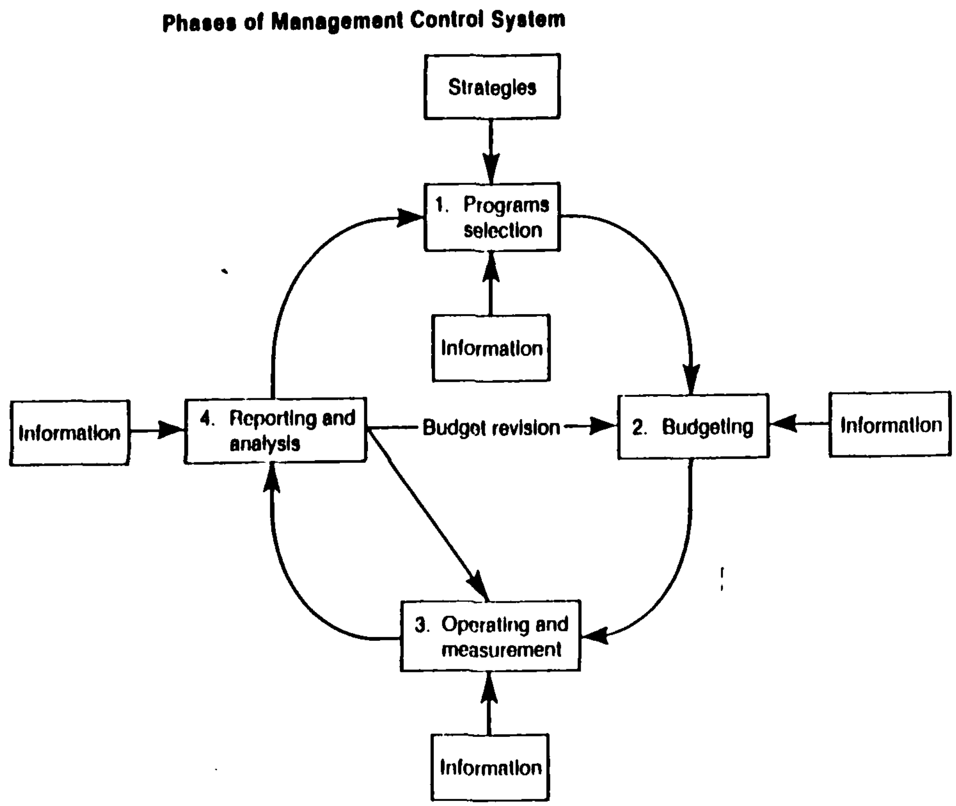

Figure 4.3: Phases of Management Control System
Source: Anthony, Dearden, and Bedford, on <u>Management Control Systems</u>.

senior level management and the department head level management.

> Although these informal activities are of great importance in management control, they are not amenable to a systematic description. [Ref. 34:p. 26]

In addition to the rigid chain of command structure and and informal activities of the management control process, SIMA Little Creek uses the following methods in management control:

1. The operating budget plays a major role in defining what can be accomplished in terms of productivity at SIMA Little Creek. If funds are not available or are depleted near the end of an operating quarter, the repair jobs can be rescheduled for another quarter. A more likely course of action (especially if the repair is mission critical to the ship or an operational necessity type of repair) is to request additional repair funding.

2. Performance based and formal financial reports also constitute a method of control. These reports are forwarded to superiors in the chain of command and describe the activity's performance.

The combination of organizational structure, the chain of command, an informal management control system, financial constraints and administrative reports culminate in a tightly woven management control system that guides SIMA Little Creek in performing its assigned mission.

V. PRODUCTIVITY MEASUREMENT AT SIMA LITTLE CREEK

Productivity at SIMA Little Creek is officially measured using a new computer-based program called Engineered Time Values, (ETV). This measurement program was installed at SIMA Little Creek as part of a new computer management system known as the Area Maintenance Management Information System, (AMMIS) on June 1, 1985. [Ref. 35]

A. AREA MAINTENANCE MANAGEMENT SYSTEM (AMMIS)

The AMMIS network consists of a DPS-6 Honeywell Computer System, with eleven on-site terminals, and computer communications capability with Readiness Support Group (RSG), Norfolk, (SIMA, Little Creek's reporting senior); ships equipped with the Shipboard Non-tactical Automatic Data Processing Program II (SNAPS II) an on board computer system; and other SIMA activities. The AMMIS program is designed to support three functional areas; the SIMA activity, the Readiness Support Group, and the supply system at each individual SIMA. The SIMA and RSG systems were installed at the time of this report, however the supply support system is not yet operational. [Ref. 36]

The AMMIS system under the SIMA functional area runs the ETV program. Additionally, it provides the following services:

-tracks repair/maintenance jobs in progress.

-maintains 31 Consolidated Shipboard Maintenance Programs (CSMP).

-issues job orders.

-various administrative reports.

To handle the bulky task of data processing, five full time data processors are employed in the Maintenance Data Center (MDC). Working through two shifts, the data processors input the majority of the data via batch processing. [Ref. 37]

B. PRODUCTIVITY MEASUREMENT USING ENGINEERED TIME VALUES

The ETV productivity measurement system analyzes productivity based on certain measurable factors influencing performance and utilization of man hours. Using computed formulas, four essential indices are calculated weekly, and reported on RPT NO: ETV 279AR, Engineered Time Values, Weekly E.T.V. Analysis-Detail By Shop, (Figure 5.1, Part 2)

These indices are:

1. Net man-hour productivity, a percentage expressing the overall shop efficiency for a reported period, based on the work accomplished compared to the total gross productive man-hours available for work.

$$\text{Net man-hour productivity} = \frac{\text{earned man-hours}}{\text{gross productive available man-hours}} \times 100$$

$$= \text{performance} \times \text{utilization.}$$

ENGINEERED TIME VALUES
WEEKLY E.T.V. ANALYSIS - DETAIL BY SHOP
DATE

PART 1 - PRODUCTIVE MAN-HOURS DISTRIBUTION

SIMA
RPT NO: ETV 279AR
PAGE: 10

SHOP: 31A SKILL FACTOR: 0.85

---GROSS M-HRS ASSIGNED---					TOTAL DEDUCTS M-HRS	-NET PROD AVAIL- M-HRS		—OVERTIME— PROD M-HRS		M-HRS UNASSIGNED TO JCNS	EARNED M-HRS	LOST TIME M-HRS
TOTAL	PROD SUPT	% OF TOTAL	PROD AVAIL	% OF TOTAL		CURR	PAST 6	CURR	PAST 6			
1288.4	150.0	12	1138.4	88	493.2	645.2	619.6	13.4	2.8	82.1	472.8	40.8

*************** > PART 2 - PRODUCTIVE MAN-HOURS INDICES < ***************

NET MAN-HOURS INDICES				GROSS M-HR INDICES		LOAD RATIO	LOST TIME FACTOR
PERFORMANCE	WORKLOAD PERFORMANCE	UTILIZATION	PRODUCTIVITY	UTILIZATION	PRODUCTIVITY		
73%	84%	57%	42%	50%	37%	87%	6%
PAST 6 WEEK AVERAGES							
79%	94%	59%	46%	51%	40%	83%	10%

*************** > PART 3 - DEDUCTIONS FROM PRODUCTIVE MAN-HOURS AVAILABLE < ***************

STANDARD	SCHOOLS/ TRAINING	MEDICAL	ADMIN	SPECIAL ASSIGN	LEAVE	SPECIAL LIBERTY	U.A.	OTHER	TOTAL
120.0	156.2	3.5	24.9	122.3	40.2	26.1	0.0	0.0	493.2

*************** > PART 4 - LOST PRODUCTIVE TIME < ***************

CODE	REASON	M-HRS	CODE	REASON	M-HRS	CODE	REASON	M-HRS
A	CBT PRTS/SUP/TL	15.0	L	AWAIT SHIP FORC			DIFFERENT METHOD:	
B	AWAIT TRANSPORT		M	SHIPS DRILL		Q1	NEW SET-UP	3.0
C	AWAIT GA		N	SHOP EQUIP INOP	1.0	Q2	PARTS FROZEN	
D	AWAIT NDT		O	CHNG IN WEATHER		Q3	DEPART FR SPECS	
E	AWAIT FIREWATCH			REWORK:		Q4	PART BUILD-UP	
F	AWAIT SHIP ACCS		P1	FAILED TEST	3.0	Q5	MISC.	
G	AWAIT RIGGERS	1.0	P2	RELAP/REGRIND			SUBTOTAL:	3.0
H	MAKE TOOLS/PART	0.5	P3	WRONG MATERIAL	3.0	R	OTHER	8.5
I	AWAIT AWC/CRAFT		P4	WRONG MEASURE				
J	AWAIT TAGOUT		P5	MISC.	4.0			
K	AWAIT REF MATL	1.0		SUBTOTAL:	10.0			
							SHOP TOTAL	40.8

Figure 5.1: Engineered Time Values Weekly E.T.V. Analysis
Detail by Shop RPT No: ETV 279AR

2. Gross man-hour productivity, a percentage expressing the overall shop efficiency for the reported week, based on the work accomplished compared to the total gross man-hours assigned.

Gross man-hour productivity = performance x gross utilization.

3. Load ratio, a percentage expressing the degree of loading for the reported week, based upon comparing the man-hours assigned to work to the net productive man-hours available to do work.

Load ratio =

$$\frac{\text{net productive man-hours-unassigned man-hours}}{\text{net productive available man-hours}} \times 100$$

4. Lost time factor, a percentage expressing the amount of lost productive time in man-hours for the reported week compared to the amount of productive manpower that was available.

$$\text{Lost time factor} = \frac{\text{lost productive time in man-hours}}{\text{net productive man-hours available}} \times 100$$

[Ref. 38]

The weekly report is divided into four sections, as follows:

1. Part 1--Productive man-hours distribution. This section calculates the total number of productive man-hours available (including overtime production), man-hours otherwise available for work but not so assigned because of lack of work, and the total number of man-hours of lost productive time for all reported reasons.

2. Part 2--Productive man-hours indices. This section calculates the four indices described above. In addition to these indices, a running average of the reported week's figure with the five preceding weeks' figures for each index is displayed and titled "Past 6 Week Averages."

3. Part 3--Deductions from productive man-hours available. Accounting for man-hour deductions from productivity is calculated and used in Part 1 to

determine total number of productive man-hours available.

4. Part 4--Lost productive time. This calculates productive time lost due to other than worker related causes. [Ref. 39]

The above productivity indices take into account the six important criteria required to successfully establish productivity measurement discussed in Chapter III. The ETV weekly reported indices allow line managers to compare past and present productivity levels for each shop and determine the relative productivity during each period. Although SIMA Little Creek is a government activity, and as such is a nonprofit organization, the ETV program permits SIMA to accurately measure their productivity (efficiency), in terms of productive man-hours, load ratio and lost time factor. What is not measured is SIMA Little Creek's contribution to public welfare or their effectiveness.

C. ETV ACCEPTANCE PROBLEMS

The previously described technical productivity measurement system, ETV, has been in use since June 1, 1985 and has yet to gain wide-spread acceptance with management. Certainly the "newness phenomenon" could be the cause of this initial lack of popularity. The ETV measurement system is easy to use (using the weekly report, Figure 5.1) with only a short indoctrination course required. A common management perception is that the ETV system can be tricked by imputing "slightly altered" figures; such as changed

skill factors, in manipulating deductions from productive man-hours available (medical and administrative time off for example), and by strict input of lost productive time (set-up times, parts support, material problems, weather conditions and so on). Management's perception can be summarized by the acronym, GIGO, "garbage-in garbage-out" [Ref. 40]. Though management's perception was that the measurement system could be fooled, no indication of actual altering was uncovered. SIMA Little Creek is staffed by a vast majority of senior enlisted Navy members, who did not grow up in the "computer culture," and many of these older men distrust technological advances outside of their specialty area. As a result, a much longer acceptance period can be expected when introducing a new system. Therefore, before ETV is fully accepted and extensively used at SIMA Little Creek, further indoctrination, more familiarity, and a longer acceptance period will be required.

D. NON-TECHNICAL PRODUCTIVITY MEASUREMENTS

Various less technically-oriented productivity measurements were used prior to ETV. These were:

1. Management by walking around (MBWA). Managers frequently walk around the facility and gauge the amount of productivity by observing shop personnel. Managers use past experience to arrive at an unscientific estimate of what they feel is the current level of productivity. [Ref. 41]

2. Observation of the parking lot technique. This indicator is determined by checking employee parking lots at strategic times during the day. Just prior to the lunch break and before the close of business, the manager observes employee traffic in the parking lot. Substantial early traffic indicates not enough work has been assigned to the offender's shop, and therefore that particular shop is not being fully productive. At this point, additional work, if it is available, can be assigned to that shop to increase productivity. [Ref. 42]

3. Completion rate. This measurement technique measures the completion rate of the number of job orders accepted versus the number of jobs completed. A figure from 68-80 percent is considered acceptable. [Ref. 43]

4. Number of productive man-hours. This productivity measure was manually figured using a compilation of inputs from the various shops. This productivity index, measuring only input, was normally considered to be two weeks old and of little use to the line managers. The preferable means of estimating productivity was to use MBWA. However, a comparison of the productive man-hour statistic does provide a yardstick for yearly comparisons. Using this measure to compare productivity between 1982 and 1984, (Table 5.1), it indicates productivity has steadily increased. [Ref. 44]

TABLE I

COMPARISON OF TOTAL PRODUCTIVE MAN-HOURS BY YEAR

Year	Total Productive Man-hours
1982	560,000
1983	572,000
1984	653,000

5. Several of the shop supervisors used a combination of esoteric yardsticks such as (1) gainful employment for an eight hour period per day, (2) the amount of overtime the shop worked, or (3) the percentage of rework the shop had to do. A rework figure of 5

percent or less was considered to be productive. [Ref. 45]

6. The "waterfront" reputation of the SIMA was also considered to be a good yardstick of productivity at the shop level. This yardstick was informally obtained by communication between ships company and SIMA personnel. [Ref. 46]

E. CURRENT PRODUCTIVITY MEASUREMENT

Currently the managers of SIMA Little Creek are using a combination of productivity measurements. The official productivity measurement reported to superiors is the ETV index. At the local activity level, the managers are using combination of the ETV indices and MBWA to accurately gauge the amount of productivity within the shops. [Ref. 47]

VI. THE PECI APPLICATION PROCESS, PECI PROJECTS, AND PRODUCTIVITY IDEAS

In Chapter II of this report, the PECI program is summarized as providing "for capital investment in equipment and facilities which will increase output of an organization in relationship to inputs." The PECI program is designed to increase an organization's efficiency and effectiveness through productivity increases.

A. DoD GUIDANCE

Detailed DoD guidance is contained in DoDINST 5010.36, Productivity Enhancing Capital Investment, of December 31, 1980. Managers are urged to improve their organization's efficiency and effectiveness, increase productivity via capital investment awareness, and promote the substitution of capital for labor in order to optimize the productivity of the defense work force. Managers at all levels are encouraged to aggressively apply for PECI funds whenever appropriate. Top priority PECI projects are those that accomplish capital-labor substitutions through productivity capital investment and that amortize themselves within the shortest amount of time. [Ref. 48:p. 4]

In identifying, documenting, selecting, financing, and applying for PECI projects the following specific procedures are specified:

1. The PECI project proposal shall be reviewed prior to approval and funding to ensure that it:

   a. Is a desirable action and meets long-range planning objectives, is a valid need, and complies with policies and regulations governing the acquisition of capital equipment.

   b. Is subjected to economic analysis.

   c. Has complete documentation to allow pre-investment analysis and post-investment evaluation.

2. Resource requests for PIF and other CSI projects shall be included in Program Objective Memoranda (POM) and budget requests.

3. Management guidelines for PEIF and PIF projects are documented and included in the submission package.

4. The PECI projects shall be monitored on a periodic basis to ensure that projected benefits and objectives are achieved.

5. Accountability procedures shall be initiated and information maintained on a project-by-project basis for PECI projects. The following are the minimum requirements:

   a. Verification of obligation and expenditure of funds.

   b. Identification of the amount or reapplication of savings achieved.

   c. Evaluation of productivity improvements.

   d. Comparison of net benefits achieved with net benefits predicted in project justifications.

   e. Identification of project/program deficiencies, and corrective action taken.

   f. An audit of projects.

6. The PECI projects are subject to audit in accordance with DoDINST 7600.3, <u>Internal Audit in the Department of Defense</u>, of January 4, 1974. [Ref. 49:pp. 4-6]

A thorough set of instructions for completing the PECI application process is included as separate enclosures to DoDINST 5010.36. General and specific information required by format line item is provided, and a complete set of sample forms are included. Guidelines for managing and evaluating PECI projects by program type, i.e., PEIF, PIF, are clarified and reporting procedures detailed. DoDINST 5010.36 is a complete guide for DoD managers who seek information on how to apply for PECI projects.

B. LOCAL GUIDANCE

The COMNAVSURFLANTINST 4400.1C, Surface Force Supply Procedures, of June 6, 1984, provides immediate guidance authority. Similar to DoDINST 5010.36, the CNSL guidance provides explicit instructions concerning the PECI application process. Additional forms are provided to further assist the manager in applying for PECI projects, most notably, instructions and forms on uniformly measuring procurement costs and a form on conducting the economic analysis required to support the PECI request.

This instruction is careful to remind the manager that various categories of equipment must be screened and approved prior to submission as PECI projects. These categories are reprographic equipment, word processing equipment, and automatic data processing equipment. Equipment managers are designated for each category:

1. The Navy Publication and Printing Service (NPPS) with technical review and approval of all reprographic transactions within DON.

2. The Chief of Naval Operations, (OP-09b11) is charged with approving all word processing equipment leases or procurements.

3. Commander, Naval Surface Force, U. S. Atlantic Fleet (CNSL N76) is responsible for approving all leases or purchases of automatic data processing equipment. [Ref. 50]

C. SIMA LITTLE CREEK PECI PROCESS

The SIMALCREEKINST 4400.2, Productivity Enhancement Program, of February 9, 1982, provides the activity's guidance concerning the PECI program and sets forth command procedures and responsibilities. Recognizing that the SIMA personnel turnover rate is high, this instruction stresses the importance of establishing workable controls to ensure that the post-installation cost analysis documentation is submitted for PECI projects.

As directed by this instruction, the Supply Officer will:

1. Review all requests by the shops or groups for procurement of PECI projects. Recommend approval or disapproval of these requests to the Commanding Officer.

2. Prepare and maintain a current list of PECI projects at SIMA for which the the two year payback period has not expired. This list will show detailed data concerning the PECI projects, so that post-installation reports can be submitted as required.

3. Post a placard on each piece of PECI equipment when it is received. The placard shall state "Productivity Enhancement--Record of Utilization and Cost Data

Required," followed by the date when the two year data collection period is over.

4. Remove placard from equipment when the post-installation cost analysis report is submitted.

5. Periodically review equipment usage logs to ensure that the logs are being maintained.

6. Prepare the post-installation report required for PECI equipments.

7. Notify his relief of the reporting requirement for PECI equipment.

The Repair Officer is responsible for:

1. Preparing an equipment usage log book for each PECI project installed at SIMA.

2. Ensuring that the log books are kept current.

3. Assisting the Supply Officer in preparing the post-installation cost analysis report. [Ref. 51:pp. 1-3]

The SIMALCREEKINST 4400.2 specifies the command productivity enhancement program. However, the program has not become established enough to have permeated the organizational structure beyond senior management. The command level and department head management were familiar with the PECI program and the command's productivity enhancement program. Management below these levels was unaware that specific productivity enhancement programs existed [Ref. 52]. The Supply Officer is the driving force behind SIMA's PECI program. PECI project applications are usually submitted when CNSL requests PECI project submissions, normally early in each calendar year. occasionally a PECI project is submitted at times other

than budget call requests. Solicitation of PECI project ideas, gathering of the data required and submission of the application package is left to the Supply Officer. This can be an overwhelming task in view of the Supply Officer's numerous other responsibilities.

SIMA Little Creek can request equipment funding via six different programs:

1. Operating Forces Support Equipment (OFSE). This category is to be used for non-technical general purpose investment equipment, in support of forces afloat. Designed for items costing less than $3,000, the equipment must be repairable, nonconsumable, and not part of the national stock system. [Ref. 53: p. Q-2]

2. Defense Industrial Plant Equipment Center (DIPEC). DIPEC maintains a storage facility of surplus equipment. Prior to purchasing equipment, DIPEC must be screened to see if they already have the piece of equipment in inventory. If the equipment is in inventory, it is shipped to the customer, rather than ordered new. [Ref. 54:pp. D-12-14]

3. Industrial Plant Equipment (IPE). This category consists of all equipment and machines tools having an initial acquisition cost of $3000 or more. Usually this consists of heavy industrial machinery. The manager for this program is the Plant Equipment Support Office (PESO) in Annapolis, Maryland. [Ref. 55:p. D-14]

4. Productivity Enhancing Incentive Funds (PEIF). This consists of equipment costing less that $100,000 and having a payback period of two years or less. [Ref. 56]

5. Productivity Investment Funds (PIF). In this category the equipment must cost more than $100,000 and have a payback period of four years or less. [Ref. 57]

6. Phased Replacement Program. This program is used to replace equipment that is projected to be beyond its useful service life and has been requested and budgeted via phased replacement planning. [Ref. 58]

An unusual and unplanned issue of equipment is occasionally provided by project offices. An example of this is Naval Electrical Engineering Command providing SIMA Little Creek with a Hewlett Packard HP 8902A measuring receiver. This piece of equipment is used in troubleshooting electronic gear. Used continuously throughout the day, the shop supervisor estimated that the technician using this state-of-the-art equipment doubles his productive output. [Ref. 59]

With various equipment sources and programs available to the Supply Officer, he normally initiates applications several months before the submission due dates of the budget call. The shop supervisors are canvassed for equipment requirements and productivity enhancing ideas. The shop supervisor initiates the required paperwork on forms provided by the Supply Officer. The shop supervisors are not familiar with the different funding programs or the different requirements of each, but they are able to fill out the forms provided. The Supply Officer reviews the requests and channels each request into the individual equipment program categories discussed above. Each category requires its own format submission package. The Supply Officer discusses each proposed project with the initiating supervisor in an attempt to validate the requirement and justify submission. If the project is temporarily approved, detailed justification write-ups are initiated at the

supervisor's level, while the Supply Officer assembles the remaining required forms. The Supply Officer collates the various projects into their proper categories, finalizes the package, and prioritizes the requests. This package is then submitted to the Commanding Officer who reviews all requests for validity and command prioritization. This is a lengthy and time consuming process. On the average more than sixty days are required to initiate project ideas, assemble the submission package, review and submit to the Commanding Officer for approval. If expensive pieces of equipment are involved, ninety days are often required to obtain price quotations from various vendors. [Ref. 60]

D. LOCAL PECI RESULTS

Although the above process may sound cumbersome, the final results are impressive. SIMA Little Creek has been very successful in getting PECI projects approved. SIMA Little Creek aggressively uses the PECI program and has, to date, had more PECI projects funded than other CNSL commands (Figure 6.1) [Ref. 61]. Currently, fifteen PEIF projects are installed, one project is under contract, and two have been approved and are awaiting funding. The Supply Officer submits PECI projects throughout the year, not only at budget call. He also maintains a list of nice-to-have productivity enhancing items, which are not mission

YEAR	TOTAL # OF PECI PROJ SUBMITTED TO CNSL	SIMA ACTIVITY	# OF PROJ SUBMITTED BY EACH ACTIVITY	# OF PROJ APPR-OVED & FUNDED	# OF PROJ APPROVED/ AWAITING FUNDING	NO STA-TUS
1985	16	LITTLE CREEK	3	1	2	0
		NORFOLK	4	0	3	1
		CHARLES-TON	2	0	1	1
		MAYPORT	2	0	2	0
		GITMO	1	0	1	0
1984	3	NORFOLK	2	1	1	0
		MAYPORT	1	1	0	0
1983	4	LITTLE CREEK	2	2	0	0
		GITMO	2	2	0	0
1982	0					
1981	0					
1980	UNK *	LITTLE CREEK	4 + *	4	4	0
		NORFOLK	4 + *	4	4	0
		CHARLES-TON	4 + *	4	4	0
		MAYPORT	3 + *	3	3	0

* RECORDS INCOMPLETE

Figure 6.1: PECI Project Submissions By Activity
Source: CNSL PECI Project Manager, November 15, 1985

critical, in the event that additional last minute funding becomes available. [Ref. 62]

The CNSL PECI manager was interviewed in order to estimate PECI project application activity. As SIMA's type commander, all PECI project applications must be submitted directly to CNSL. Overall, the CNSL PECI program is not very active. Sixteen projects were submitted in 1985, only three projects in 1984, and four projects in 1983 (Figure 6.1).

E. PECI PROJECTS AT SIMA LITTLE CREEK

Since 1977, SIMA Little Creek has been authorized sixteen PECI projects. These projects are chronologically listed in Figure 6.2. [Ref. 63] The PECI project data listed in Figures 6.1 and 6.2, does not correlate for several reasons. The data was prepared by and obtained from different sources. CNSL PECI records are incomplete and were compiled post facto by the CNSL PECI project manager in 1982. SIMA Little Creek supply records could not be verified for accuracy. PECI projects are not always approved and funded simultaneously. For example, a project could be approved in 1985, but not receive funding until 1986. In addition, confusion exists at the activity level concerning which fiscal year's funds are used and when their approved projects will be funded.

CHRONOLOGICAL LISTING OF PECI PROJECTS AT SIMA LITTLE CREEK

#	EQUIPMENT	DATE RECEIVED	DATE INSTALLED
1	50,000LB CABLE DYNAMOMETER (2)	30 MARCH 77	30 MARCH 77
2	PORTABLE BORING BAR	21 MAY 78	22 MAY 78
3	SIMPSON 760A CALIBRATOR	6 JUNE 78	6 JUNE 78
4	PIPE CUT OFF/ END PREP SET (4)	13 SEPTEMBER 79	13 SEPTEMBER 79
5	HYDRAULIC TEST BENCH	27 FEBRUARY 80	30 NOVEMBER 81
6	SHEET METAL FORMING MACHINE	27 JUNE 80	24 JUNE 80
7	DIESEL NOZZLE RESEATING MACHINE	5 NOVEMBER 80	5 NOVEMBER 80
8	15in x 50in LATHE	20 MARCH 81	20 MARCH 81
9	17in x 78in LATHE	4 MAY 81	6 MAY 81
10	WIRE ROPE CUTTER	26 OCTOBER 81	*
11	WIRE ROPE GRIP ATTACHMENT	11 JANUARY 82	12 JANUARY 82
12	PANTOGRAPH CUTTER	19 JANUARY 82	19 JANUARY 82
13	HYDRAULIC BEARING PULL	17 FEBRUARY 82	18 FEBRUARY 82
14	ABRASIVE BLAST CABINET CYCLONE RECLAIMER	11 DECEMBER 82	11 DECEMBER 82
15	GATE VALVE WEDGE & SEAT REFINISHER	9 MAY 85	9 MAY 85
16	GLOBE & SAFETY VALVE WEDGE & SEAT REFINISHER	9 MAY 85	9 MAY 85

* NOT INSTALLED. ELECTRICAL SERVICE NOT AVAILABLE

Figure 6.2 PECI Projects at SIMA Little Creek
Source: SIMA Little Creek, Supply Officer, August 1985

Fifteen of the sixteen PECI projects funded have been installed and are operational at SIMA Little Creek. Project number ten, the wire rope cutter, has not been installed due to insufficient electrical service. The cable shop is located at the old SIMA site, and the electrical service in the old building is not adequate to support this equipment. Electrical service is sufficient in the new facility, and if room can be found in this overcrowded site the wire rope cutter can be installed. [Ref. 64] In addition to these PECI projects, SIMA Little Creek has one authorized and funded PECI project under contract (Table II).

TABLE II

PECI PROJECTS UNDER CONTRACT

EQUIPMENT	ANTICIPATED DELIVERY DATE
DIESEL ENGINE FLUSHING PUMP & FILTER UNIT	FALL 1985 [Ref. 65]

Two additional PECI projects that were submitted as part of the FY85 budget package, were approved, and are awaiting funding (Table III.)

TABLE III

PECI PROJECTS APPROVED AND AWAITING FUNDING

EQUIPMENT
SELF PROPELLED FLOOR SWEEPER/SCRUBBER (QUANTITY 2)
MINOLTA RP509 READER/PRINTER [Ref. 66]

Since 1980, SIMA Little Creek has received approval and funding for seven of the nine PECI projects they have submitted for a success rate of 78 percent (Figure 6.3). SIMA Little Creek has received 21 percent of all PECI projects within CNSL jurisdiction. Their success rate is significantly higher than other commands. This success can be attributed to the careful planning and screening of their requests, and the meticulous preparation of the PECI application package. [Ref. 67]

Surprisingly, the degree of use of each of the installed PECI projects is not the same. A sampling of how these projects are used follows:

1. Project number one--Cable dynamometer. This project is used in pull testing wire cable pendants manufactured for ships. Each cable is required to be weight tested, a safety requirement, and the data recorded and provided to the ship. The dynamometer "saves time and is easier to rig than other methods of weight testing." [Ref. 69]

2. Project number two--Portable boring bar. This piece of gear is infrequently used, but when required is an absolute necessity, otherwise the repair cannot be performed. The portable boring bar has been used three times in the last eighteen months. [Ref. 70]

3. Project number three--the Simpson 760A calibrator. This piece of equipment is used between four and eight hours each day. The shop supervisor stated that this equipment is indispensable in properly performing his function. He did not look at the project as a productivity enhancing piece of gear, but rather a fundamental necessity. [Ref. 68]

4. Project number four--Pipe cut off and end preparation tool. This project has been used approximately once a

CNSL-SIMA ACTIVITY	# OF PROJECTS SUBMITTED	# OF PROJ APPROVED & FUNDED	SUCCESS RATE %	% OF PROJ FUNDED/ TOTALS
LITTLE CREEK	9	7	78	21
NORFOLK	10	5	50	15
CHARLES-TON	6	4	67	12
MAYPORT	6	4	67	12
GITMO	3	2	67	6
NEWPORT *	0	0	0	0
totals	34	22		

* New command

All percentages rounded to nearest whole number

Figure 6.3: Aggregate Project Totals--Showing Command Success Rate And Percent of Total Since 1980
Source: CNSL PECI Project Manager, November 1985

year for the past two years. Tool history earlier than 1983 is not available. [Ref. 71]

5. Projects number five through nine, and number fourteen are in continuous use daily. While the respective shop supervisors considered the equipment essential in order to perform their jobs, productivity enhancement was not voluntarily mentioned. [Ref. 72]

6. Projects number fifteen and sixteen--the valve wedge and seat refinishers were used once a month. The shop supervisor stated that other tools within the shop did a better job and as a result, the PECI project was used infrequently. [Ref. 73]

7. Projects number ten through thirteen are used infrequently. No accurate estimate of usage was available.

Reviewing how the PECI projects are used indicates that a majority of them are used daily and are considered mission essential by the shop supervisors. A common trait among skilled craftsmen is the desire to use modern, well made, state-of-the-art equipment. The above PECI projects, while not all state-of-the-art, are modern, well made pieces of machinery. The new equipment is easier to use than older machinery and usually requires less repair, suggesting increased productivity as a result. It is easy to imagine how the equipment can become "essential" to the respective shops. When questioned about the PECI projects, not one supervisor spoke in terms of productivity enhancement when describing the individual equipment. When pressed, improved "productivity" was mentioned, but not quantified with a figure or percentage. [Ref. 74]

Attempting to judge whether the PECI projects have met their initial justification requirements is difficult. The post-installation reports required after the first two years of use indicate that the productivity enhancing requirements and pay back period were met. However, the above sample of project use may suggest differently for a few of the projects. Some of the older projects are now outdated and could be replaced by more efficient machinery. Some of the infrequently used projects suggest, poor initial screening.

F. PRODUCTIVITY ENHANCING IDEAS AT SIMA LITTLE CREEK

In addition to productivity enhancement projects, other methods to increase productivity are available, i.e., a simple reshuffling of organizational structure, management seminars, and training sessions. These techniques can lead to increased productivity at a much lower cost than large scale capital investments in equipment, computers, and machinery.

The Area Maintenance Management System and the Engineered Time Values are tools that allow SIMA management to schedule repairs, track the status of all repair jobs, calculate productivity indices, and produce administrative reports using modern management systems.

The boat pool concept at SIMA Little Creek is another management technique used to efficiently repair and maintain

small boats available for immediate issue. As the Tidewater area boat pool, SIMA repairs, exchanges, and issues a large number of small boats yearly, providing a valuable service to ships that must have boats on board to go to sea. The boat pool concept is not state-of-the-art technology, but rather a scheduling and management "tool" to consolidate several small facilities under the roof of one activity, allowing for more precise tracking of repairs and assets, more efficient use of available resources, and providing better service to the fleet.

Along the lines of the above pooling technique are several other similar programs that have been recently introduced:

1. The P250/250E (a shipboard, portable, gasoline driven fire pump) pool. Each Navy ship has several of these pumps, and their maintenance has proven to be time consuming and difficult because the pumps operate in a corrosive salt water environment. Frequent repairs are required. Ease of starting and reliable operation are mandatory. SIMA Little Creek has initiated a one-for-one exchange program to assist the ships. Additionally, a clean, well-equipped shop is provided to ship's force to repair minor pump problems. This is an extremely valuable service to the waterfront; the ship's fire fighting capability is increased by having reliable, working fire pumps. This exchange program is proving to be very successful and popular with the ships. The amount of productivity enhancement is difficult to estimate--especially since it is a new concept and assets and facilities are being combined under one roof. Ship's force and SIMA personnel working together further compound measurement difficulties.

2. CNSL has designated SIMA Little Creek as the head repair facility for the following equipment:

a. 3"50 gun mounts

b. URQ-10

This repair consolidation improves productivity by pooling equipment technicians who are trained to repair specific equipment, pooling assets, allowing better tracking of parts and equipment and providing better service to the customer because he can can send his equipment to a specified repair activity. [Ref. 75]

Shop supervisors and managers were interviewed during the research phase of this paper. These personnel were asked for their productivity enhancing ideas and the following uncensored ideas are presented:

1. Provide each electrical technician with his own tool box and a complete set of repair tools. This will stimulate the technician to take care of his tools, enhance the quality of his work, and increase productivity. [Ref. 76]

2. Provide more pre-expended bin items in support of electronic repair. (Pre-expended bin items are spare repair parts maintained at the repair shop level. The repair technician can save time by drawing from local parts caches instead of drawing from central supply issues.) [Ref. 77]

3. Use the PIF fund to purchase computer numerically controlled machine lathes. (Two such lathes were requested in FY85 using the PIF program. SIMA Little Creek does not think they will be funded because such machinery is normally associated with production facilities with repetitive type work and not for repair activities.) [Ref. 78]

4. Increase the supply system's responsiveness to emergent requirements. (The supply department procurement process is strictly regulated which restricts their responsiveness. This can be crippling when performing an emergency repair to allow a ship to meet operational commitments.) [Ref. 79]

5. The age of the shop equipment ranges from brand new to fifty years old. The average machinery technology

in the shops is ten to twenty years old. Purchase state-of-the-art equipment. [Ref. 80]

6. Obtain the use of productivity experts as consultants to help commands increase productivity [Ref. 81].

7. Install the last segment of the AMMIS system--the supply support side--this would be a big plus in helping the supply department track and respond to parts requests [Ref. 82].

8. Purchase a jeweler's lathe and a bake oven [Ref. 83].

9. Purchase attachments for the boring mill in order to increase its capacity [Ref. 84].

10. Purchase a computer driven, numerically controlled (CNC) retrofit attachment for the vertical milling machine. (The idea behind this retrofit is that CNC equipped machinery is much more accurate, produces a better quality product, and increases the operator's productivity. The shop supervisor stated that the young machinists who report to him have been trained on the modern CNC machinery at trade school and they must be retrained in manually controlled machine use). [Ref. 85]

11. Obtain hydraulic tracing capability for lathes [Ref. 86].

12. Purchase a travel dial indicator for lathes. Track indicators are better than digital readouts because the digital readouts have problems with metal chip fouling. [Ref. 87]

13. Purchase a horizontal band cutoff saw and an abrasive cutoff saw. The horizontal band saw is automatically loaded, provides close cutting tolerances and is very precise, requiring little finish work. The abrasive disk, also known as a suicide wheel, can cut large pieces of steel stock much quicker than horizontal band saws but more finish work is required. [Ref. 88]

14. Improve metal flame spray capability which will result in less corrosion damage and result in less rework [Ref. 89].

15. Increase photo engraving capability to provide more service to the ships [Ref. 90].

16. Install a small foundry to make parts in house instead of having to contract out. This would make emergency repairs much easier. [Ref. 91]

Many of these ideas have been submitted as productivity enhancing ideas to management at SIMA Little Creek. What management does with these ideas is discussed in Chapter VII.

VII. IMPEDIMENTS TO PRODUCTIVITY ENHANCEMENT

Throughout the interview process, shop supervisors indicated that suggestions they thought to be productivity enhancing ideas were not adopted by management. Frequently they received no feedback to their suggestions. Within the organizational structure of SIMA Little Creek, certain impediments filter the communication process and block the development of productivity enhancing ideas.

The objectives of this chapter are to discuss the idea filtering process and identify the impediments that block the productivity enhancement process at SIMA Little Creek. Methods to eliminate or minimize the impact of these impediments are discussed in Chapter VIII.

A. FILTERS

Chapter VI of this report details the productivity enhancement capital investment process at SIMA Little Creek. The manner in which this process is structured results in the chain of command acting as a filtering mechanism in the following manner:

1. The Shop Level Technician

In order for shop level personnel to participate in the productivity enhancing process, they must feel that open, two-way, non-punitive communication exists within the

organization [Ref. 92:pp. 20-21]. Another term for this environment is a "supportive administrative climate" [Ref. 93:pp. 3-6]. This concept is difficult to instill within an organization, and cannot be accomplished with lip service by management. It must be proven to exist daily by management's actions. Numerous reasons cause shop level personnel to act as the initial filter to productivity enhancing ideas by failing to submit or promote their ideas upward in the chain of command. Reasons for their failure to initiate ideas are numerous, i.e., lack of a reward system, poor communication between organizational structure levels, lack of employee motivation, personnel turnover turbulence, poor relations between employee and supervisor, lack of training at the shop level, poor working conditions, obsolete equipment, low pay and a host of other problems that affect the worker at his work place [Ref. 94:pp. 3,6,15,21-28]. Taken individually, the above problems are barriers to the communication of productivity enhancement ideas. Taken as a group, these problems form a strong filter that can curtail the submission of ideas, or at best slow the process. Even under the best management, worker-management interface problems continue to exist, but management's priority must be to actively cultivate an atmosphere in which all employees seek an increase in productivity. One means of accomplishing this is to encourage the submission of productivity enhancing ideas.

2. <u>The Shop Supervisor</u>

As the first level of management, the shop supervisor's position is the keystone for a successful organization, for it is at this level that the "process tone" is set. Receptive management at all levels is important, but never more so than at this interface level. The shop supervisor is in daily contact with all of his personnel, and he has the opportunity to encourage management's policies and goals. If management's goals are to increase productivity via productivity enhancement, the shop supervisor is at the best level to champion the concept. Naturally, the supervisor acts as a filter in the communication process if he fails to forward all ideas submitted to him. He is also in the unique position of being able to provide feedback to his personnel, providing a strengthening the supervisor-worker relationship.

The experienced shop supervisors also submit their own ideas via the chain of command. They are required to fill out the initial paperwork and justification statements, and determine the productivity benefits. This introduces another area of filtering--the supervisor can "color" his presentation by selectively requesting favorable equipment procurement bids, manipulating increased productivity benefit figures, and by taking the time to write detailed and glorified justification comments. Because of his

experience, the shop supervisor's ideas carry a lot of weight within the management structure.

3. <u>The Supply Officer</u>

The Supply Officer is designated as "the point man" in initiating the PECI process each year. Within the organizational structure at SIMA Little Creek, the Supply Officer is not in the production chain of command, but provides a supporting function for the command. The Supply Officer is not in a position to know what the command requires in the way of productivity enhancing capital investments, but is only informed via the PECI requests he receives from the shop supervisors. This places him in an awkward position, rather like trying to push a rope instead of pulling it. A re-organization of the productivity enhancement process could place a production line officer in charge of the idea submission process. This recommendation will be further discussed in chapter eight. Requiring the Supply Officer to act in this capacity fails to take advantage of the best experience levels within the command. In evaluating the merits of the ideas the Supply Officer receives, he is concerned with three criteria; the urgency of need, cost savings, and expected productivity benefits [Ref. 95]. These criteria are used to categorize the requests into applicable funding programs. In order to obtain the information required to make the above decisions, the shop supervisors are required to submit the initial

paperwork to the Supply Officer. The Supply Officer is poorly equipped to decipher the submitted proposals and to evaluate them according to actual merit and not hyperbole. He must judge the proposals in the best manner he can, although he is unable to rely on production experience or specialized education in this field. The results of this process are not surprising--a thorough filtering of ideas that are submitted via the chain of command.

4. The Commanding Officer

The final filter within the organization is the Commanding Officer. He is responsible for the final PECI application package. The Commanding Officer usually restricts his filtering to command prioritizing of projects. He rarely eliminates them. At SIMA Little Creek, the Commanding Officer (CO) also initiates productivity enhancing ideas and project suggestions, which in turn are aggressively pushed by all management levels [Ref. 96]. At SIMA Little Creek the CO is very active and visible about the command. He tours the activity several times daily, visiting the shops to view production activity, talk with employees and get a "feel" for what is occurring within his command. This "management by walking around" technique is popular with SIMA's personnel, giving them a secure feeling that their CO cares about them and their performance. More importantly, it gives the shop level personnel a chance to talk with the CO and suggest productivity enhancing ideas

directly to him. An individual's idea has a much greater chance of survival if the CO understands it and views it as an opportunity to increase productivity. Several productivity enhancing ideas have been implemented as a result of this informal process. [Ref. 97]

Filters act as a funnel, restricting the flow of suggestions and ideas as they travel via the chain of command. It is important to recognize this occurrence, because observant management could expediently eliminate or minimize the effect of the filtering process. The use of creative management, i.e., changing organization structure, introducing committee action, and increasing employee participation, is a step toward unobstructed communication.

B. BARRIERS

Barriers that block or impede the introduction of ideas are much more difficult to counter and take more management involvement on a continuing, daily basis. Dr. W. Edwards Deming believes that there are two areas that cause variations in productivity: (1) faults of the system--common or environmental, which account for 85 percent; and (2) special causes--causes specific to a certain worker or a machine, which account for 15 percent. Both causes require the attention of management, but problems with the system consistently overshadow special causes. Efforts to correct faults of the system lead to the greatest

productivity improvement. [Ref. 98:p. 3] David Bain states that ". . . changes in the work environment have created productivity-inhibiting problems to be solved" [Ref. 99:p. 27]. Common sense dictates that if management is to be successful, it must focus attention on correcting system deficiencies.

A common barrier usually listed as an impediment to employee participation is the worker's attitude. A negative attitude affects productivity and participation in achieving the organization's goals, as does the perception of low pay, being a government employee, frustration with the system and low organizational morale. This is not a problem at SIMA Little Creek. With free access to the activity and in across the board interviews with all levels of the organization, strong, positive morale was observed, as were feelings of organization identification. Positive comments were encountered throughout the data gathering process.

Psychologists, including Abraham Maslow, Frederic Herzberg, Peter Drucker, and Douglas McGregor, have addressed the phenomenon of the human versus the organization. Their work has identified the needs of the individual, successful management practices, theories of motivation and the interaction of the individual within an organization.

A recent study conducted by the Navy Personnel Research and Development Center San Diego, <u>An Examination of</u>

Productivity Impediments In The Navy Industrial Community, identified specific barriers to the productivity process. Several of these are directly applicable to SIMA Little Creek: [Ref. 100:pp. 21-28]

1. Lack of an effective way to measure productivity. This barrier has been recognized. The AMMIS and ETV measurement systems have effectively eliminated the barrier. Although the systems are new and relatively unpopular, there are signs that management feels they have made a good start toward the measurement of productivity. [Ref. 101]

2. Lack of sufficient means to reward those who enhance productivity. No efforts have been made to combat this barrier at SIMA Little Creek. [Ref. 102]

3. Management turbulence (a result of the rotation of military officers.) This is a continuing problem, and one which has no easy solution within the military environment.

4. Lack of adequate capital investment. Chapter VI discussed the average age of SIMA Little Creek's machinery and their inability to replace it. The PECI program is allowing SIMA Little Creek to procure new productivity enhancing machinery on an incremental basis.

5. Supply support. SIMA Little Creek is having difficulty in acquiring material needed to conduct repairs in a timely manner. This results in work slowdowns and equipment cannibalization, causing delays in starting and finishing jobs. The increased watch dog attitude of senior supply department activities and the structured procurement process further exacerbates the problem. Management is looking to the installation of the supply portion of the AMMIS system to help alleviate some of these problems. [Ref. 103]

6. Facilities. The new facility which houses SIMA Little Creek is already overcrowded. The physical separation of the shops and supporting functions of the new and old facilities continues to be a barrier to productivity. [Ref. 104]

7. Erratic workload related to uneven workload flow. This problem is partially caused by fluctuations in the fleet's deployment schedule. When ships depart their homeport to relieve deployed ships, or participate in fleet exercises or emergent operations, the majority of SIMA Little Creek's clientele are out of town, leading to erratic work loading. This leaves the repair activity with a lot of capability but little work and the attendant problems of what to do with the idle work force. Training schools and training sessions are employed to help combat this problem. [Ref. 105]

These seven barriers to the productivity process require management attention. However, not all of these problem areas are directly controllable by SIMA Little Creek management, and efforts to overcome uncontrollable impediments result in frustration. Although SIMA Little Creek is affected to some degree by these barriers, far more damaging are the effects of the filtering process. SIMA personnel freely submit productivity enhancing ideas, but the filtering process causes undeniable damage to the communication process. Therefore, efforts to overcome the controllable barriers and eliminate filtering mechanisms will be much more effective and immediately productive.

VIII. CONCLUSION

This thesis has examined the productivity enhancing capital investment process at SIMA Little Creek, Virginia. They are using the productivity capital investment program to obtain PECI projects. These projects and the PECI application process were documented. Productivity enhancing ideas that exist at the shop level were described. Productivity enhancing ideas and the submission of these ideas via the chain of command were explained. In this concluding chapter, an assessment of SIMA Little Creek's productivity enhancing process is provided, along with opinions and recommendations that could improve the productivity enhancing process or lead to areas of further study.

A. ASSESSMENT

The SIMA Little Creek is using ETV and the AMMIS system to measure productivity. This newly installed system is assisting SIMA Little Creek to more efficiently accomplish their assigned mission by providing a more accurate productivity measure and a better means to schedule and track repair jobs. Personnel at SIMA Little Creek are generally satisfied with their command and feel free to suggest productivity enhancing ideas. The organizational

structure of the productivity enhancing process has resulted in a filtering mechanism and barrier to the communication of ideas being submitted via the chain of command. This filtering mechanism acts as a funnel and restricts the submission of productivity enhancing ideas. Barriers can prevent the submission of these ideas. SIMA Little Creek has been very successful in having PECI projects approved and funded. This process could be made more successful if the filters and barriers to the communication of the productivity enhancing ideas are minimized or eliminated entirely.

Previously, PECI projects that were submitted via the chain of command required almost a year to get approved or rejected. Recent telephone conversations with two SIMA Supply Officers indicate that the approval process has accelerated, with project approvals returning within three to seven months [Ref. 106]. This rapid response better meets the needs of the individual activities, increasing their productivity and their capability in accomplishing the command mission.

Proper submission of a PECI project application does not ensure that the requesting activity will receive the exact piece of equipment required. Federal Acquisition Regulations require competitive bidding for 75 percent of procurement. Once a PECI project is approved and funded, unless a sole source statement is approved by the Naval

Supply Center, the procurement of this equipment requires three competitive bids. This bidding process is based on "general specifications" and may result in receiving equipment that is incompatible with existing equipment. The bidding process may also result in price differences between the funded PECI amount and the actual cost, requiring the Supply Officer to petition the funding source for additional funds. [Ref. 107]

B. OPINIONS AND RECOMMENDATIONS

A SIMA Little Creek command policy toward productivity enhancement has been set forth via a command instruction. This instruction delineates the procedures and responsibilities for their productivity enhancement program. However, during interviews with senior level management, department heads, and shop supervisors, no evidence of command productivity enhancement strategies, objectives, or goals was found. According to Anthony, Dearden and Bedford in Management Control Systems, a key step in the management control process is to establish organizational strategies, objectives and goals. [Ref. 108:pp. 14-15]

> Recommendation 1: Establish SIMA Little Creek command productivity enhancing strategies, objectives, and goals. Education of command members concerning command goals via training and familiarization programs would further strengthen the productivity enhancing process.

The Engineered Time Values system is used to measure productivity at SIMA Little Creek. Chapter IV discussed

methods in which this system can be misled by inputting incorrect data. To prevent mismeasurement of productivity, safeguards to prevent this occurrence should be installed.

Recommendation 2: Develop management controls to ensure that the ETV system correctly measures productivity. A supervisor, knowledgeable in command activity and ETV systems, could review ETV inputs to ensure accurate data inputs.

The Supply Officer is fully occupied with a myriad of responsibilities as the supply department head. The daily pressures of providing repair materials needed for crucial ship repairs, while processing long lead time supply procurement items and providing complete supply support functions, allow him little time to plan, initiate, and execute the command budget. He has little time to conduct thorough program funding analysis, account for various funds, and submit the required reports. The burden of detailed program and report submission requirements restrict the Supply Officer's attention to the demanding requirements of managing the important aspects of the supply department.

Recommendation 3: Provide a comptroller billet for SIMA Little Creek with the following responsibilities:
1. Direction of command financial matters.
2. Maintain the classification of programs administered, their objectives, budget plans, and program schedules.
3. Conduct budget formulation, review, and execution.
4. Collect obligation, expenditure, cost, and other accounting and operating data.
5. Review program performance against the financial plan.
6. Promote economy and efficiency in the performance of assigned programs. [Ref. 109:p. B-5]

The organization of SIMA's productivity program currently designates the Supply Officer as the key man in

charge of the PECI program process. Although SIMA Little Creek has been successful in obtaining PECI projects, this organizational structure results in a staff department head administering a line function. The Supply Officer is not the most experienced department head with production experience. A line manager actively involved in production would bring valuable experience to the productivity enhancing process. The line manager would be designated in charge of the productivity enhancing process to initiate projects and champion the process.

Recommendation 4: Restructure the organization of the productivity enhancing program and designate a line production manager in charge of the program.

The current productivity enhancing process is operated in an informal and sporadic manner. This approach ignores the members of the organization itself. A concerted, cooperative, and systematic effort on the part of all command members is an uncommon but superior approach to increasing productivity enhancement. It channels the collective and informed intelligence of the whole organization on the problem of productivity enhancement [Ref. 110:pp. 182-183]. Participative organizations are more productive, provide better service, have reduced personnel turnover problems, less employee grievances, less waste, more efficiency, and better morale than any other form of organization known [Ref. 111:p. 173]. A participative organization is one in which the employees

take part in setting goals and objectives and devise means to achieve them. There are several ways to structure a participatory organization, but one method that is successful in a military organization is the committee approach. This system allows command members to work with their supervisors and submit ideas and suggestions to a productivity enhancement committee via shop representatives or the chain of command. The important concept of timely credit and recognition for new ideas can be observed, with appropriate rewards. Feedback to command members can be initiated using the committee method while keeping the chain of command intact and enhancing the two way communication process.

<u>Recommendation 5</u>: Establish a command productivity enhancement committee at SIMA Little Creek.

The SIMA Little Creek senior level management recognizes that they would benefit from having "production experts" examine their facility, study the repair process, and provide them with productivity enhancing recommendations [Ref. 112]. The recommendations for state-of-the-art equipment may not be economically feasible, but improvements in management methods and techniques may be very cost effective.

<u>Recommendation 6</u>: Have productivity experts study SIMA Little Creek for more efficient methods of conducting their mission.

During personnel turnover, important facets of the productivity enhancement process are lost. For example, during the relief of Supply Officers, new replacements are not always familiar with the PECI program, and the detailed intricacies of the submission process. A new Supply Officer already inundated with unfamiliar daily responsibilities will require a period of indoctrination before he is able to continue the PECI process, and this can result in a gap in the PECI submission process. [Ref. 113]

> Recommendation 7: Require relieving supply department personnel active in the PECI process to be fully indoctrinated in the PECI program.

Several of the PECI projects at SIMA Little Creek are infrequently used. Shop supervisors indicated that these projects were essential in accomplishing unusual repair jobs. It may be that these projects were pursued to increase SIMA's mission capability and not to enhance productivity. Appropriate alternative funding programs should be used if this is an actuality.

The PECI program is not an end-all to productivity enhancement. This program permits activities to increase productivity via capital investments. There are management techniques which result in productivity enhancement without capital investment. These innovative management techniques should be explored simultaneously with the PECI program to provide the greatest productivity enhancement.

C. RECOMMENDATIONS FOR AREAS OF FURTHER STUDY

1. Conduct an analysis of the time period between CNO issuing PECI project approval and issuance of funding authority. This time frame can range from one to three or more months. If the reasons causing this delay are identifiable and controllable, this period could be reduced.

2. Presently, no CNSL inspection program directly inspects the PECI program. Conduct a study to determine if an inspection program would be beneficial in monitoring and highlighting the PECI program.

3. Conduct a study at commands that have been awarded PECI projects to determine whether the projects are actually meeting proposed productivity enhancement goals. This could be done concurrently during inspections. If the projects are not being used, a decision can be made as to PECI project disposal if they are no longer needed.

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